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प्लास्टिक – परीक्षण पद्धतियाँ

भाग 4 द्रवगतिकी गुणधर्म

अनुभाग 2 फिनोलिक और सल्किल संचकन सामग्री की 2 कप प्रवाहिता

Indian Standard

PLASTICS — METHODS OF TESTING

PART 4 RHEOLOGICAL PROPERTIES

Section 2 Cup Flow of Phenolic and Alkyd Moulding Materials

ICS 83.080; 19

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

July 1999

Price Group 1

Methods of Test for Plastics Sectional Committee, PCD 23

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards after the draft finalized by the Methods of Test for Plastics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

The method prescribed in this standard is for assessing the flow properties of phenolic and alkyd moulding materials. It is not suitable for fast-curing moulding materials.

While preparing this standard considerable assistance has been taken from BS 2782 : Part 7, Method 720B : 1979 'Plastics: Part 7 Rheological properties, Method 720B, Cup flow of phenolic and alkyd moulding materials' issued by British Standards Institution, UK.

In reporting the results of a test or analysis in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

PLASTICS — METHODS OF TESTING

PART 4 RHEOLOGICAL PROPERTIES

Section 2 Cup Flow of Phenolic and Alkyd Moulding Materials

1 SCOPE

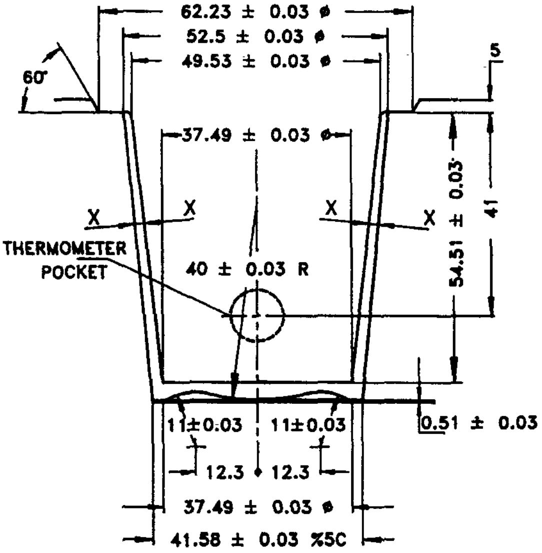
This standard (Part 4, Section 2) describes a procedure for assessing the flow properties of phenolic and alkyd moulding materials.

2 PRINCIPLE

The flow properties of moulding materials are assessed by measuring the time taken for a mould in the form of a cup of specified dimensions to close under a specified pressure and temperature.

3 APPARATUS

3.1 Standard Compression Mould of form and dimensions as shown in Fig. 1. The mould shall comply in all respects with the details shown in the figure.



All dimensions in millimetres.

NOTE — *X* Indicates smooth and polished surfaces.

FIG. 1 DETAIL OF CUP FLOW MOULD

A pocket for the thermometer shall be provided in the die to reach within 13 mm of the outside wall of the moulding.

The mould shall be made of good quality steel as usually used for moulds, for example, high carbon, high chromium, air-hardening alloy steel, hardened to 45 HRC to 48 HRC (500 HV to 550 HV).

The surfaces marked '*X*' in Fig. 1 shall be smooth and polished. The final polishing shall be in the line of the tool draw, that is, parallel to the direction of movement of the press.

The method of heating the mould shall be such as to maintain a uniform temperature within ± 1°C of the specified temperature.

3.2 Compression Moulding Press

Capable of exerting and maintaining the pressure required.

The force on the mould shall be 100 ± 5 kN, calculated according to the expression appropriate to the type of press in use. In the case of an up-stroking press

$$F = Ap - mg$$

where

F = force on the mould (in N),
A = cross sectional area of the ram (in m^2),
p = gauge pressure (in Pa),
m = mass of ram, platen and mould (in kg), and
g = acceleration due to gravity (in m/s^2).

In the case of a down-stroking press the force on the mould is given by the following expression, the symbols having the same meaning as previously:

$$F = Ap + mg$$

The cross-sectional area of the ram shall be determined from its measured diameter. The pressure gauge shall be checked for accuracy and shall be connected to the press inlet pipe. The line pressure shall not vary by more than ±3 percent during the course of the test.

The inlet of the hydraulic supply shall be chocked with a bored nipple so that the press ram travels 130 mm in a period of between 4 s and 5 s when the valve is fully opened, as at the begining of the test.

3.3 Timing Device

Graduated in divisions of 0.5 s or less.

4 PROCEDURE

Ensure that the mould is clean and polished. Heat the mould to a temperature of 163 ± 1°C determined by inserting the thermometer in the inside end of the thermometer pocket (*see* Fig. 1). Wrap the bulb of the thermometer in copper gauze or metal foil or alternatively surround it with oil to ensure that a good contact is made with the mould.

Keep the mould closed until the test is started so as to maintain a uniform temperature throughout the mould.

Weigh on to a charging scoop sufficient powder to give when moulding a flash of mass more than 2 g but less than 2.5 g. If a fibrous or other bulky material is being tested, lightly compress it before charging so as to form a cylinder of 32 to 38 mm in diameter and not more than 32 mm high.

Adjust the temperature of the powder before placing it in the mould to 10 to 40°C (that is, normal room temperature).

Open the mould sufficiently to charge it with the powder; then close the mould. Ensure that the time from the beginning of the charging to closing the mould and applying full pressure is between 5 s and 10 s.

Measure the time in seconds from the instant that the hydraulic gauge shows pressure (indicating that the initial pressure has been applied) to the instant that the flash ceases to move.

5 EXPRESSION OF RESULTS

Express the cup flow of the material as the time in seconds measured in accordance with **4**.

6 TEST REPORT

The test report shall include the following information:

a) A complete identification of the material tested, including type, source, manufacturer's code numbers, previous history, etc;

b) A reference to this Indian Standard; and

c) The result of the test.

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